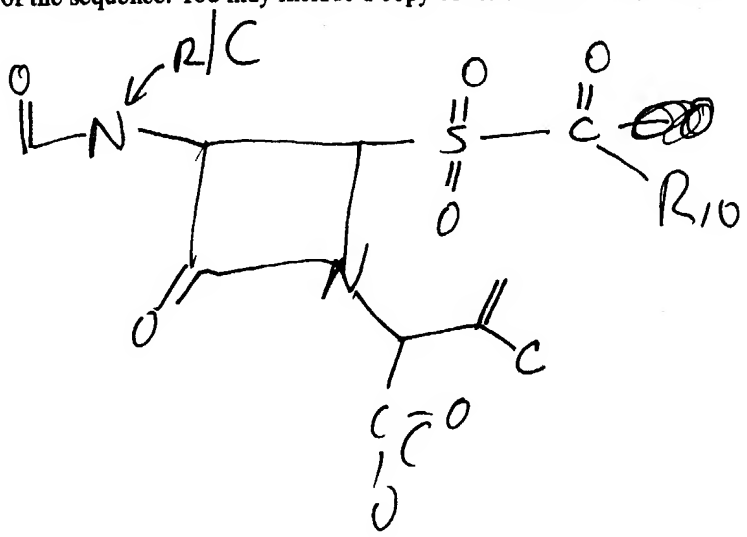
Name: [illegible] Number: [illegible]

Date: 6/9/04 Phone: 571-272-0663 Art Unit: 1624

Office Rem 5C01 Mailbox 5C18

**Search Topic:**

Please write a detailed statement of search topic. Describe specifically as possible the subject matter to be searched. Define any terms that may have a special meaning. Give examples or relevent citations, authors, keywords, etc., if known. For sequences, please attach a copy of the sequence. You may include a copy of the broadest and/or most relevent claim(s).




$R_{10}$ = C (Rn chain)

## STAFF USE ONLY

Date completed: _____

Searcher: _____

Terminal time: _____

Elapsed time: _____

CPU time: _____

**Search Site**

_____ STIC

_____ CM-1

_____ Pre-S

**Type of Search**

**Vendors**

_____ IG

_____ STN

_____ Dialog

_____ APS

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=> d his ful

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L2             0 SEA SSS SAM L1
L3             0 SEA SSS FUL L1
L4                STR L1
L5             0 SEA SSS SAM L4
L6             0 SEA SSS FUL L4
L7                STR L4
L8             0 SEA SSS SAM L7
L9                STR L7
L10            0 SEA SSS SAM L9
L11               STR L4
L12            0 SEA SSS SAM L11
L13            0 SEA SSS FUL L11
L14               STR L7
L15               STR L7
L16            0 SEA SSS SAM L15
L17            0 SEA SSS FUL L15
L18               STR L15
L19            0 SEA SSS SAM L18
L20            0 SEA SSS FUL L18
L21               STR L18
L22            0 SEA SSS SAM L21
L23            1 SEA SSS FUL L21  I copyd from Reg. - see dgnc str at

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L24            1 SEA ABB=ON  L23  I cut from CASReact

     FILE 'HCAPLUS' ENTERED AT 13:50:53 ON 15 JUN 2004
L25            1 SEA ABB=ON  L23  I cut from CAPlus

     FILE 'REGISTRY' ENTERED AT 14:12:44 ON 15 JUN 2004
L26               STR L21

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L21             STR
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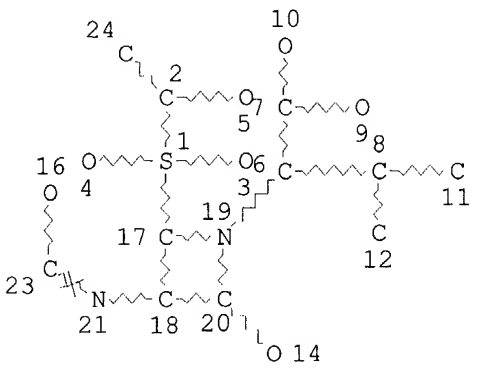

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DEFAULT MLEVEL IS ATOM
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS  21

STEREO ATTRIBUTES: NONE
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L24           1 SEA FILE=CASREACT ABB=ON  L23
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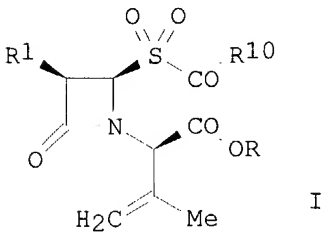
L25 ANSWER 1 OF 1 HCAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 2001:618007 HCAPLUS
DOCUMENT NUMBER: 135:180659
TITLE: Process for preparation of 3-methylene cephams from monocyclic β-lactam intermediates via intramolecular cyclization
INVENTOR(S): Cooper, Robin; Barrett, Anthony
PATENT ASSIGNEE(S): Cooper Consulting Inc., USA
SOURCE: PCT Int. Appl., 32 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| WO 2001060828 | A1 | 20010823 | WO 2001-US4410 | 20010210 |
| W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM | | | | |
| RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG | | | | |
| EP 1183262 | A1 | 20020306 | EP 2001-910546 | 20010210 |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO | | | | |
| US 2003036650 | A1 | 20030220 | US 2001-958857 | 20011231 |
| US 6683176 | B2 | 20040127 | | |
| US 2004106790 | A1 | 20040603 | US 2003-706683 | 20031112 |

PRIORITY APPLN. INFO.: US 2000-183083P P 20000216
WO 2001-US4410 W 20010210
US 2001-958857 A3 20011231
OTHER SOURCE(S): CASREACT 135:180659; MARPAT 135:180659
GI

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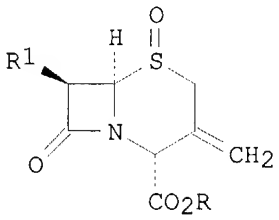



II

AB Processes were presented for the use of β-lactams, such as I [R = Me, NO2-4-C6H4CH2, carboxy protecting group; R1 = phthalimido, PhOCH2CO, PhCH2CO, acylamino, imidazolidinyl; R10 = ], as intermediates for the synthesis of corresponding 3-methylene cephams II. The synthetic processes included the intramol. cyclization of penicillin sulfoxide derived monocyclic azetidinone derivs. either thermally or with lanthanide metal salt catalysts. Thus, β-lactam I (R = R10 = Me, R1 =

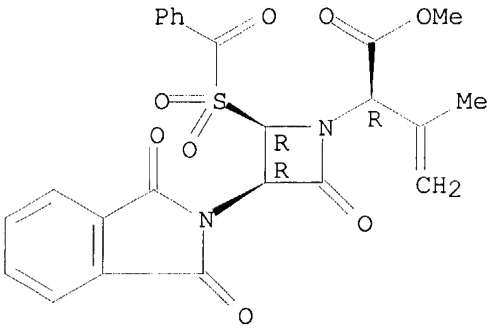
phthalimido) underwent intramol. cyclization in MeNO2 in the presence of [Yb(OH2)9](OTf)3 at rt for 3 h to give the corresponding cephem II in 65% yield as a mixture of (R)- and (S)-S(O) diastereoisomers.

IT **355378-24-4**
RL: RCT (Reactant); RACT (Reactant or reagent)
(process for preparation of 3-methylene cephams from monocyclic β-lactam intermediates via ytterbium catalyzed and thermal intramol. cyclizations)

RN 355378-24-4 HCAPLUS

CN 1-Azetidineacetic acid, 2-(benzoylsulfonyl)-3-(1,3-dihydro-1,3-dioxo-2H-isoindol-2-yl)-α-(1-methylethenyl)-4-oxo-, methyl ester, (αR,2R,3R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.

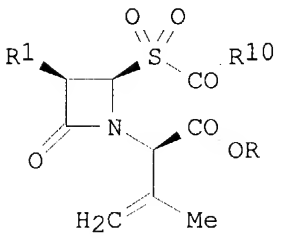



REFERENCE COUNT: 1 THERE ARE 1 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L24 ANSWER 1 OF 1 CASREACT COPYRIGHT 2004 ACS on STN
AN 135:180659 CASREACT
TI Process for preparation of 3-methylene cephams from monocyclic β-lactam intermediates via intramolecular cyclization
IN Cooper, Robin; Barrett, Anthony
PA Cooper Consulting Inc., USA
SO PCT Int. Appl., 32 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C07D501-24
ICS C07D205-095
CC 26-5 (Biomolecules and Their Synthetic Analogs)
FAN.CNT 1

| | PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|---|
| PI | WO 2001060828 | A1 | 20010823 | WO 2001-US4410 | 20010210 |
| | W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM | | | | |
| | RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG | | | | |
| | EP 1183262 | A1 | 20020306 | EP 2001-910546 | 20010210 |
| | R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO | | | | |
| | US 2003036650 | A1 | 20030220 | US 2001-958857 | 20011231 |
| | US 6683176 | B2 | 20040127 | | |
| | US 2004106790 | A1 | 20040603 | US 2003-706683 | 20031112 |
| PRAI | US 2000-183083P | | 20000216 | | |
| | WO 2001-US4410 | | 20010210 | | |
| | US 2001-958857 | | 20011231 | | |

OS MARPAT 135:180659
GI

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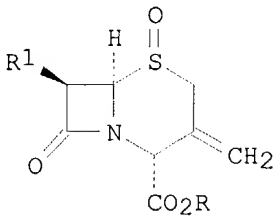



II

AB Processes were presented for the use of β-lactams, such as I [R = Me, NO2-4-C6H4CH2, carboxy protecting group; R1 = phthalimido, PhOCH2CO, PhCH2CO, acylamino, imidazolidinyl; R10 = ], as intermediates for the synthesis of corresponding 3-methylene cephams II. The synthetic processes included the intramol. cyclization of penicillin sulfoxide derived monocyclic azetidinone derivs. either thermally or with lanthanide metal salt catalysts. Thus, β-lactam I (R = R10 = Me, R1 = phthalimido) underwent intramol. cyclization in MeNO2 in the presence of

[Yb(OH2)9](OTf)3 at rt for 3 h to give the corresponding cephem II in 65% yield as a mixture of (R)- and (S)-S(O) diastereoisomers.

ST cephem synthon prepn; beta lactam cephem intermediate prepn; ytterbium catalyst beta lactam intramol cyclization

IT Cyclization
(cephams; process for preparation of 3-methylene cephams from monocyclic β-lactam intermediates via ytterbium catalyzed and thermal intramol. cyclizations)

IT Cyclization catalysts
(intramol.; process for preparation of 3-methylene cephams from monocyclic β-lactam intermediates via ytterbium catalyzed and thermal intramol. cyclizations)

IT Synthons
(process for preparation of 3-methylene cephams from monocyclic β-lactam intermediates via ytterbium catalyzed and thermal intramol. cyclizations)

IT Lactams
RL: RCT (Reactant); RACT (Reactant or reagent)
(β-, monocyclic, cephams; process for preparation of 3-methylene cephams from monocyclic β-lactam intermediates via ytterbium catalyzed and thermal intramol. cyclizations)

IT 54761-04-5, Ytterbium(III) triflate 67878-38-0
RL: CAT (Catalyst use); USES (Uses)
(process for preparation of 3-methylene cephams from monocyclic β-lactam intermediates via ytterbium catalyzed and thermal intramol. cyclizations)

IT 55029-63-5P 60771-25-7P 60771-26-8P 355378-19-7P 355378-20-0P 355378-21-1P 355378-22-2P
RL: IMF (Industrial manufacture); SPN (Synthetic preparation); PREP (Preparation)
(process for preparation of 3-methylene cephams from monocyclic β-lactam intermediates via ytterbium catalyzed and thermal intramol. cyclizations)

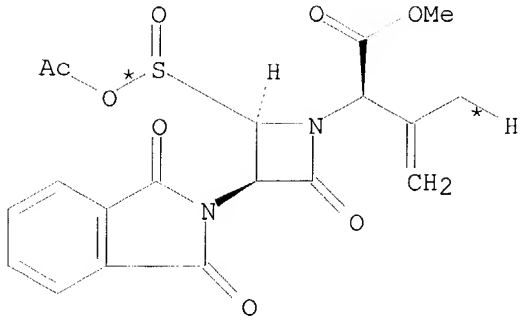
IT 127-09-3 128-09-6 563-63-3 40028-89-5 355378-23-3 355378-24-4 355378-25-5 355378-26-6 355378-27-7 355378-28-8 355378-29-9 355378-30-2
RL: RCT (Reactant); RACT (Reactant or reagent)
(process for preparation of 3-methylene cephams from monocyclic β-lactam intermediates via ytterbium catalyzed and thermal intramol. cyclizations)

RE.CNT 1 THERE ARE 1 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

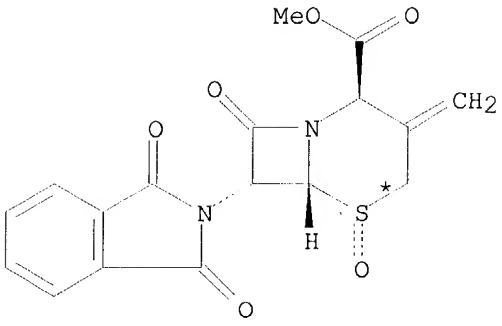
(1) Kovcevic; US 5250525 A 1993 CAPLUS

RX(1) OF 14 ...2 A ===> B + C

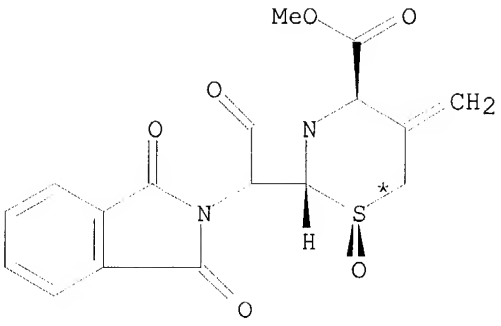


2 A

(1)



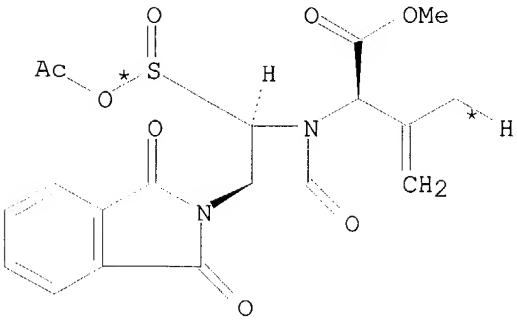
B



C

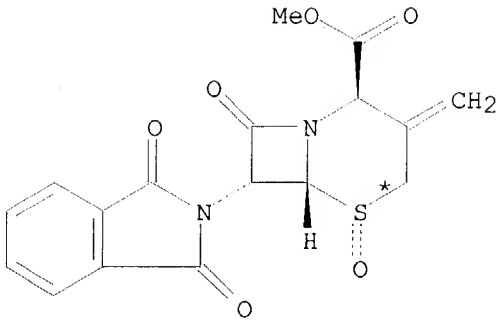
RX(1) RCT A 355378-23-3
PRO B 60771-25-7, C 60771-26-8
CAT 67878-38-0 Methanesulfonic acid, trifluoro-, ytterbium(3+) salt, nonahydrate
SOL 75-05-8 MeCN
NTE key step; 73% overall

RX(2) OF 14 2 A ===> B + C

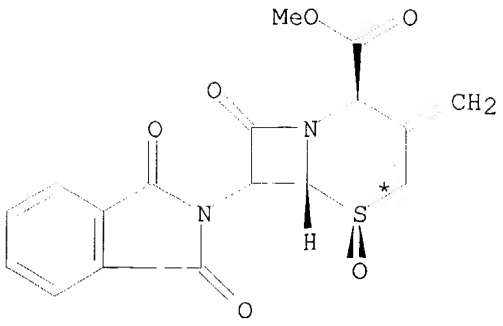


2 A

(2)



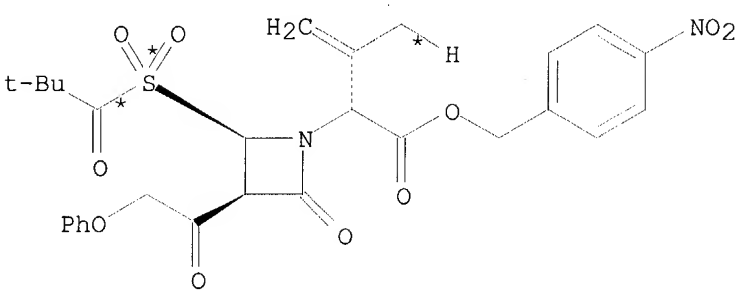
B



C

RX(2) RCT A 355378-23-3
PRO B 60771-25-7, C 60771-26-8
CAT 54761-04-5 Methanesulfonic acid, trifluoro-, ytterbium(3+) salt
SOL 75-05-8 MeCN
NTE key step; 10% overall

RX(3) OF 14 G ===> H



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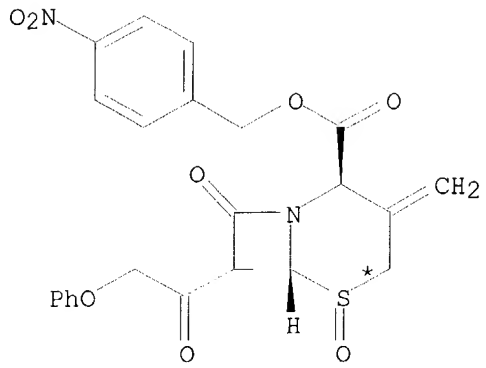
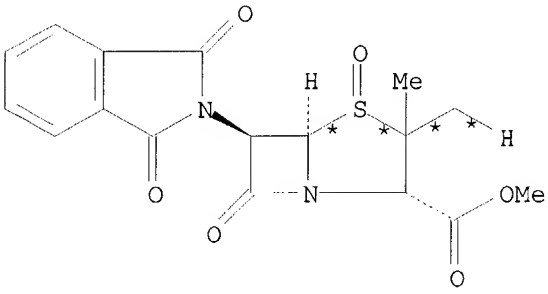


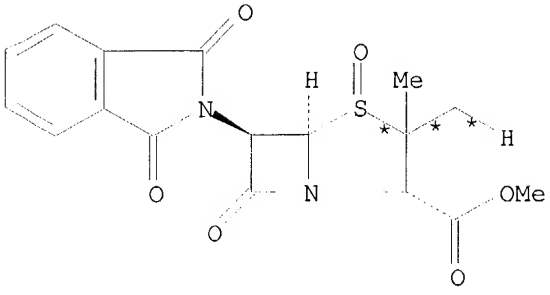
H
YIELD 56%

RX(3) RCT G 355378-25-5
PRO H 355378-22-2
CAT 54761-04-5 Methanesulfonic acid, trifluoro-, ytterbium(3+) salt
SOL 75-05-8 MeCN

RX(4) OF 14 5 I + 2 J + 2 K ===> L + M + N + O + A...



3 I



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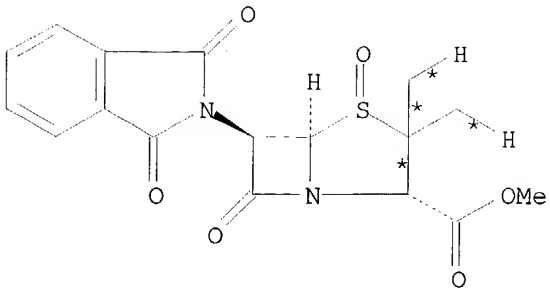

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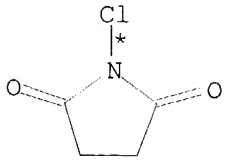
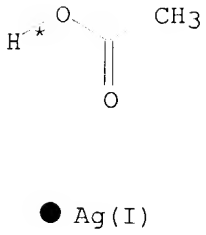
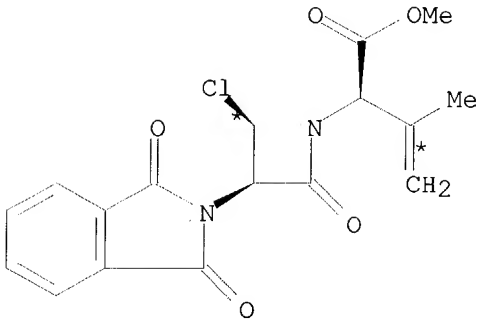


2 J

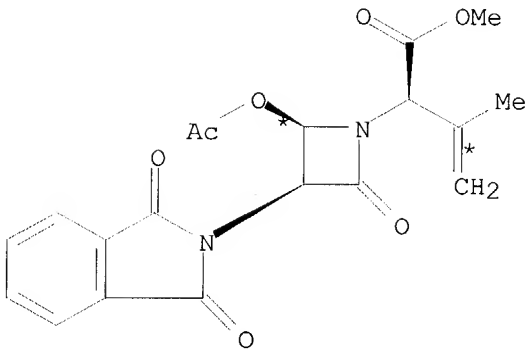



2 K

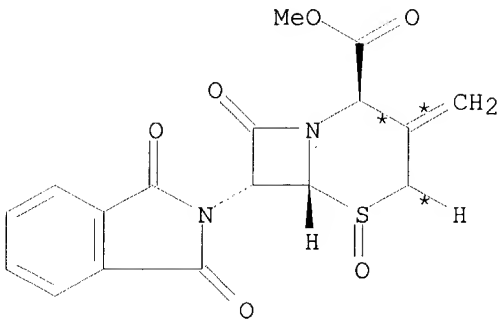
(4)



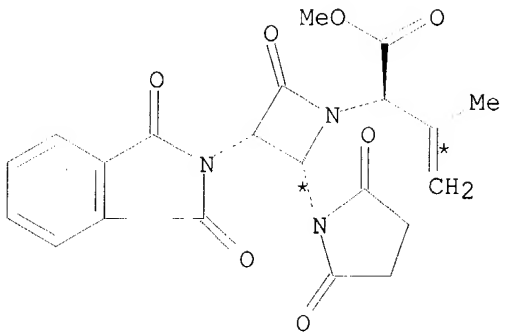
L
YIELD 4%



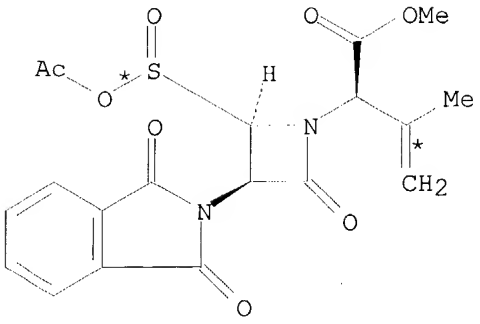
M
YIELD 3%



N
YIELD 10%



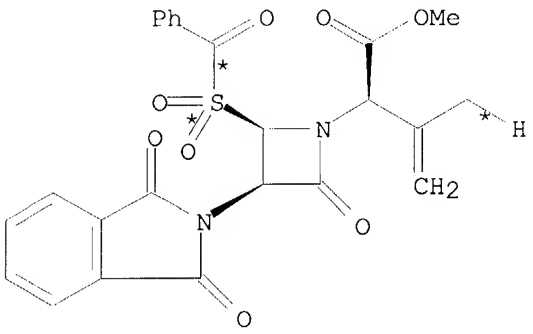
O



A
YIELD 82%

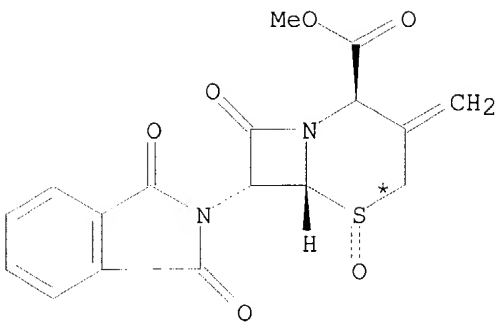
RX(4) RCT I 40028-89-5, J 128-09-6, K 563-63-3
PRO L 55029-63-5, M 355378-19-7, N 355378-20-0, O 355378-21-1, A 355378-23-3
SOL 56-23-5 CCl4

RX(5) OF 14 2 **Q** ===> B + C



2 Q

(5)



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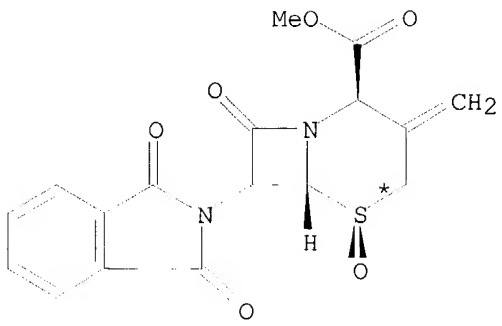
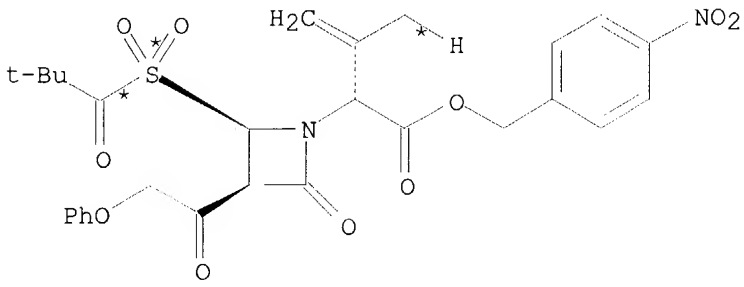


C

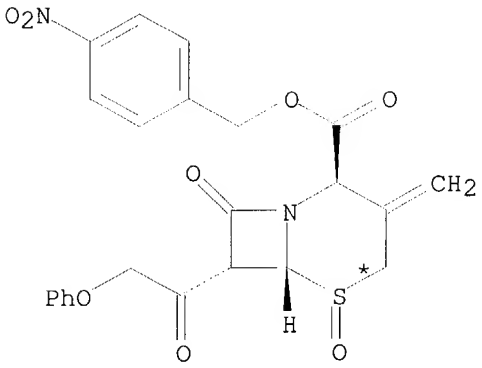
RX(5) RCT Q **355378-24-4**
PRO B 60771-25-7, C 60771-26-8
CAT 67878-38-0 Methanesulfonic acid, trifluoro-, ytterbium(3+) salt, nonahydrate
SOL 75-05-8 MeCN
NTE 50% overall

RX(6) OF 14 G ===> H



G

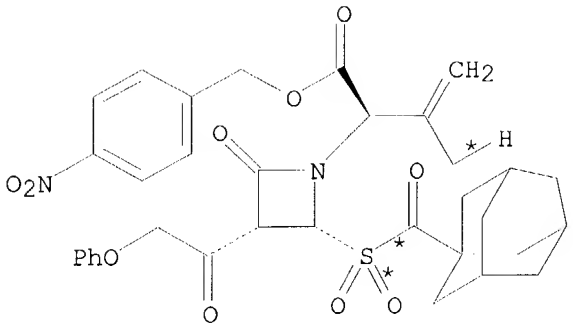
(6)



H
YIELD 29%

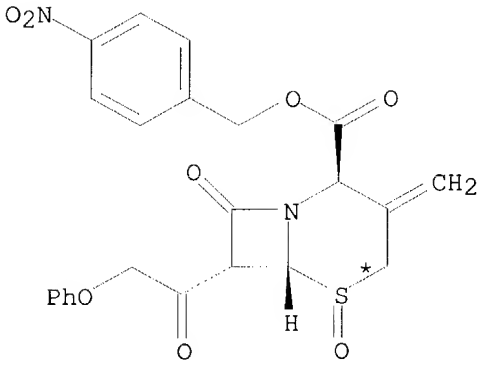
RX(6) RCT G 355378-25-5
PRO H 355378-22-2
NTE thermal (65°); neat

RX(7) OF 14 R ===> H



R

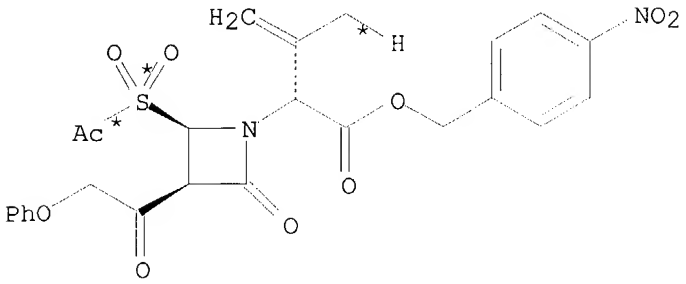
(7)



H
YIELD 24%

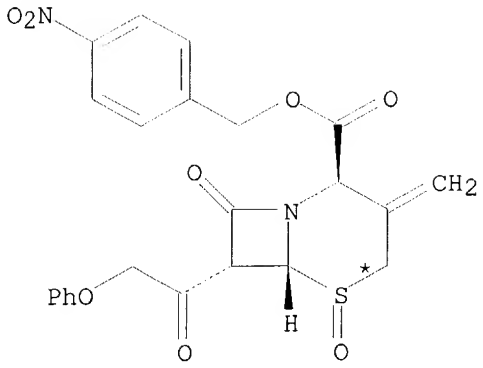
RX(7) RCT R 355378-26-6
PRO H 355378-22-2
CAT 54761-04-5 Methanesulfonic acid, trifluoro-, ytterbium(3+) salt
SOL 75-05-8 MeCN

RX(8) OF 14 S ===> H



S

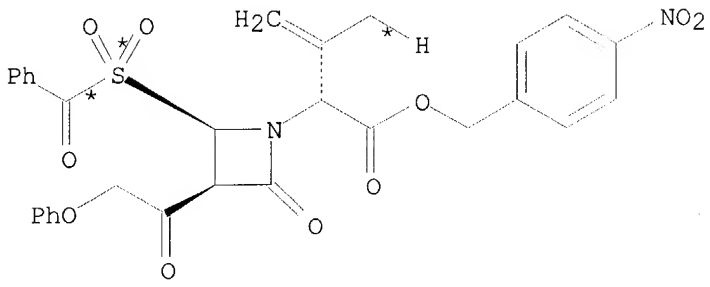
(8)



H
YIELD 50%

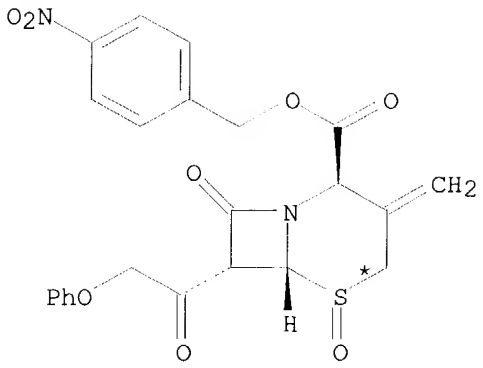
RX(8) RCT S 355378-27-7
PRO H 355378-22-2
NTE thermal (55°); neat

RX(9) OF 14 T ===> H



T

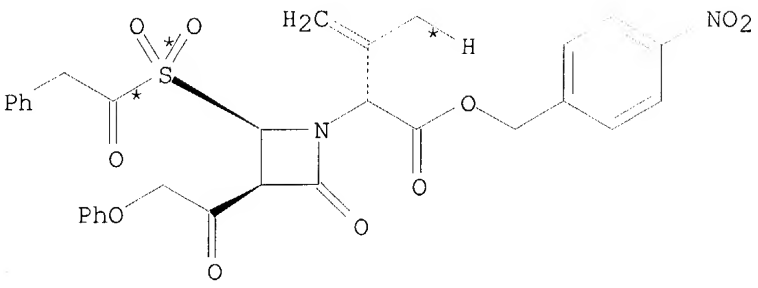
(9)



H
YIELD 22%

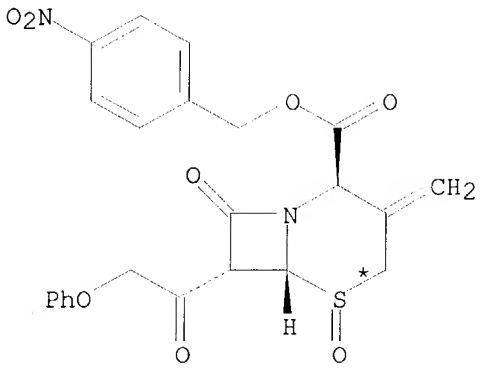
RX(9) RCT T 355378-28-8
PRO H 355378-22-2
NTE thermal (125°); neat

RX(10) OF 14 U ===> H



U

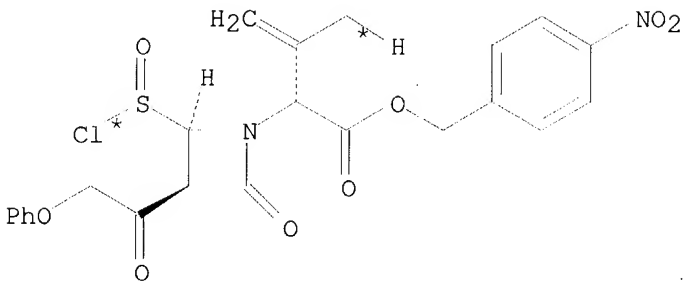
(10)



H
YIELD 31%

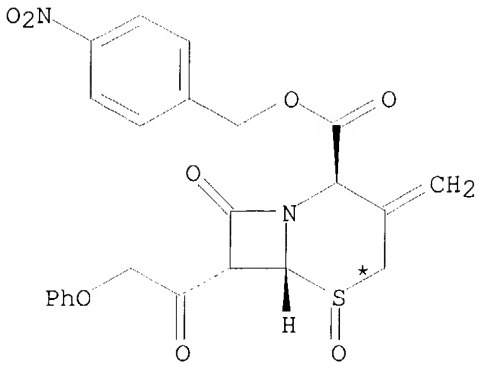
RX(10) RCT U 355378-29-9
PRO H 355378-22-2
NTE thermal (125°); neat

RX(11) OF 14 V ===> H



V

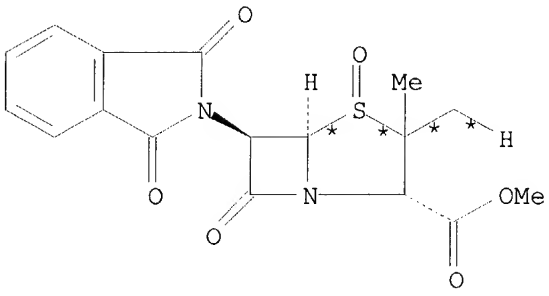
(11)



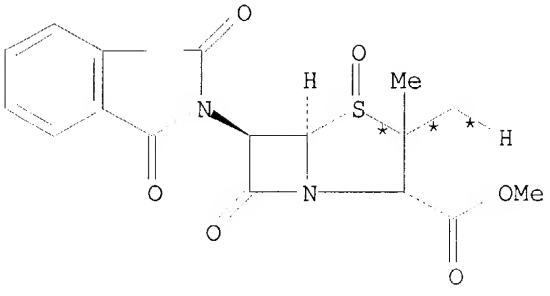
H
YIELD 64%

RX(11) RCT V 355378-30-2
PRO H 355378-22-2
CAT 54761-04-5 Methanesulfonic acid, trifluoro-, ytterbium(3+) salt
SOL 75-05-8 MeCN

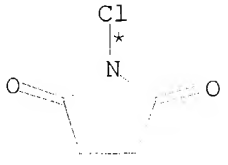
RX(12) OF 14 4 I + 2 J + 2 K ===> L + M + O + A...



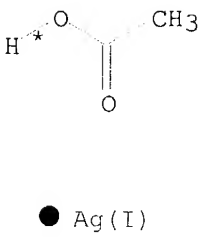
3 I



I

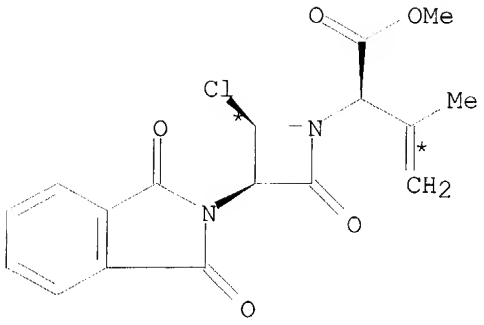


2 J

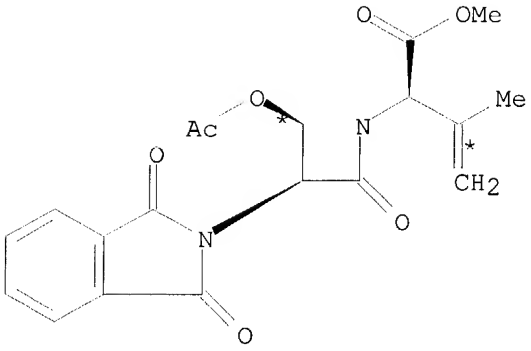


2 K

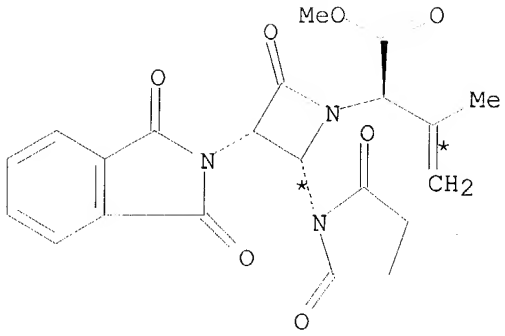
(12)



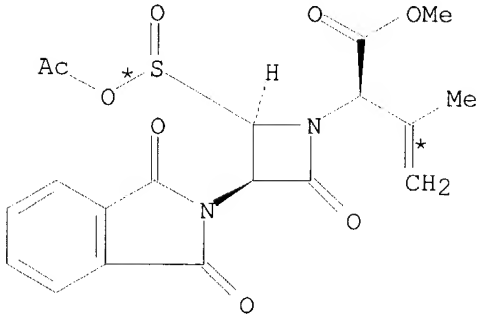
L
YIELD 17%



M
YIELD 15%



O
YIELD 4%



A
YIELD 64%

RX(12) RCT I 40028-89-5, J 128-09-6, K 563-63-3

STAGE(1)
SOL 56-23-5 CCl4

STAGE(2)
RGT W 127-09-3 AcONa
PRO L 55029-63-5, M 355378-19-7, O 355378-21-1, A 355378-23-3

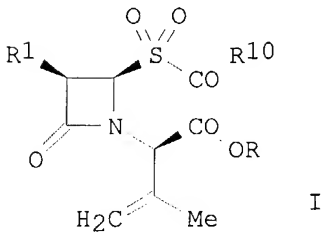
=> □

=> d ibib abs l28 1-1

L28 ANSWER 1 OF 1 MARPAT COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 135:180659 MARPAT
TITLE: Process for preparation of 3-methylene cephams from monocyclic β-lactam intermediates via intramolecular cyclization
INVENTOR(S): Cooper, Robin; Barrett, Anthony
PATENT ASSIGNEE(S): Cooper Consulting Inc., USA
SOURCE: PCT Int. Appl., 32 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| WO 2001060828 | A1 | 20010823 | WO 2001-US4410 | 20010210 |
| W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM | | | | |
| RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG | | | | |
| EP 1183262 | A1 | 20020306 | EP 2001-910546 | 20010210 |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO | | | | |
| US 2003036650 | A1 | 20030220 | US 2001-958857 | 20011231 |
| US 6683176 | B2 | 20040127 | | |
| US 2004106790 | A1 | 20040603 | US 2003-706683 | 20031112 |
| PRIORITY APPLN. INFO.: | | | US 2000-183083P | 20000216 |
| | | | WO 2001-US4410 | 20010210 |
| | | | US 2001-958857 | 20011231 |

OTHER SOURCE(S): CASREACT 135:180659
GI

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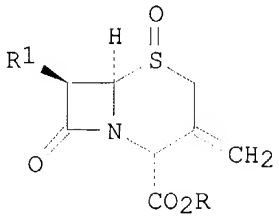


II

AB Processes were presented for the use of β-lactams, such as I [R = Me, NO2-4-C6H4CH2, carboxy protecting group; R1 = phthalimido, PhOCH2CO, PhCH2CO, acylamino, imidazolidinyl; R10 = ], as intermediates for the synthesis of corresponding 3-methylene cephams II. The synthetic processes included the intramol. cyclization of penicillin sulfoxide derived monocyclic azetidinone derivs. either thermally or with lanthanide

metal salt catalysts. Thus, β-lactam I (R = R10 = Me, R1 = phthalimido) underwent intramol. cyclization in MeNO2 in the presence of [Yb(OH2)9](OTf)3 at rt for 3 h to give the corresponding cephem II in 65% yield as a mixture of (R)- and (S)-S(O) diastereoisomers.

REFERENCE COUNT: 1 THERE ARE 1 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT